

January 6, 2022

Daniel Goldner, Chair
New Hampshire Public Utilities Commission
21 South Fruit Street, Suite 10
Concord, NH 03301-2429

RE: Docket No. DE 18-162
Public Service Company of New Hampshire d/b/a Eversource Energy

Annual Report

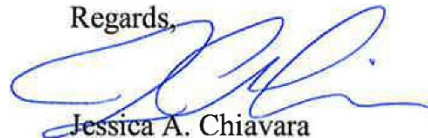
Chair Goldner:

On December 5, 2018, the Commission approved a request of Public Service Company of New Hampshire d/b/a Eversource Energy (“Eversource”) for a waiver of Puc 305.03 pertaining to the periodic testing of its meters. More specifically, the Commission authorized Eversource to shift to a calendar year testing period and to use the sampling criteria methodology and volumes as outlined within ANSI/ASQ Z1.9-2003 for testing all self-contained single and polyphase meters within its sample testing program. Eversource was also permitted to include meters removed through the course of normal business as part of the sample testing lots outlined within ANSI/ASQ Z1.9-2003.

In granting the waiver, the Commission also directed Eversource to file annual reports of the results of its meter testing program. Enclosed with this letter is the annual report of the results of Eversource’s meter testing program for calendar year 2021. This report is arranged in the manner described in Attachment A to Eversource’s October 17, 2018 petition in the instant docket.

If you have any questions, please do not hesitate to contact me. Thank you for your assistance with this matter.

Regards,



Jessica A. Chiavara
Counsel, Eversource Energy

CC: Service List

Sample Testing Program Summary – 2021

11/1/2021

This summary report shows the results of Eversource NH’s statistical analysis following ANSI/ASQ Z1.3-2003 for the 2021 sample testing program. Eversource selected and tested slightly more meters than were required for some sample lots to ensure the minimum test quantities were met.

As indicated by the ANSI analysis reports, all sample lots were found to be within acceptable tolerance limits. Only one sample lot (Lot # 6) showed a standard deviation value greater than 0.1 (0.272 for the 10 meters tested). These results are still well within established tolerances, but they do highlight the accuracy performance differences between the older electromechanical meters included within Lot #6 and the solid-state meters within the other lot groupings.

The test results confirm Eversource’s expectation that the general population of in-service meters, most of which are relatively new solid-state meters, have a weighted accuracy performance that is well within the tolerances defined in Rule 305.03 (d) (1).

This analysis follows the example shown in ANSI Z1.9-2003, Example B-3, page 40, for determining pass/fail status of a lot using a double specification limit, variability unknown, standard deviation method, using one AQL value for both upper and lower specification limits

Updated 9/7/2021							
Eversource NH 2021 Sample Testing Plan							
Parameter	Sample Tested Meters						Comments
AQL (%)	1	1	1	1	1	1	Assumed, based on prior PUC ruling
Upper Spec. Limit	101	101	101	101	101	102	Based on existing PUC limits
Lower Spec. Limit	98	98	98	98	98	98	Based on existing PUC limits
Lot Number	1	2	3	4	5	6	Lot identifier
Lot Size	476038	54697	15280	21423	817	117	Number of installed meters in the lot
Sample Size Code	P	N	M	M	J	F	From Z1.9 table A-2
Sample Size (n)	200	150	100	100	35	10	From Z1.9 table B-3.
Sample Size NHPUC required	200	150	100	100	35	10	Total number of meters to be tested.
Actual qty. tested (includes extras)	201	151	104	105	40	12	This value used in calculations below as "n".
Sum of Measurements	20100.13	15108.20	10403.59	10490.96	3999.46	1199.33	$\Sigma X =$ Sum of measured WA % Registrations
Sum of Measurements ^2	2010027.81	1511640.99	1040718.56	1048193.37	399892.10	119866.85	ΣX^2
Correction Factor (CF)	2010026.00	1511640.45	1040718.12	1048192.78	399892.01	119866.04	$CF = (\Sigma X)^2/n$
Corrected Sum of Squares (SS)	1.8090	0.5467	0.4390	0.5879	0.0937	0.8141	$SS = \Sigma X^2 - CF$
Variance (V)	0.0090	0.0036	0.0043	0.0057	0.0024	0.0740	$V = SS/(n-1)$
Estimate of Lot Std. Dev. (s)	0.0951	0.0604	0.0653	0.0752	0.0490	0.2720	$s = \text{sqrt}(V)$
Sample Mean (Xbar)	100.001	100.054	100.035	99.914	99.987	99.944	$\bar{X} = \Sigma X/n$
Upper Spec. Limit (U)	101	101	101	101	101	102	U = row 5 values shown above
Lower Spec. Limit (L)	98	98	98	98	98	98	L = row 6 values shown above
Upper Quality Index (Q _u)	10.51	15.66	14.79	14.45	20.68	7.56	$Q_u = (U - \bar{X})/s$
Lower Quality Index (Q _l)	21.04	34.03	31.16	25.46	40.53	7.15	$Q_l = (\bar{X} - L)/s$
Est. of Lot Percent Ncf. above U (P _u)	0	0	0	0	0	0	From Z1.9 table B-5
Est. of Lot Percent Ncf. below U (P _l)	0	0	0	0	0	0	From Z1.9 table B-5
Total Est. Percent Ncf. In Lot (P)	0	0	0	0	0	0	$P = P_u + P_l$
Max. Allowable Percent Ncf. (M)	2.04	2.05	2.18	2.18	2.66	3.27	From Z1.9 table B-3
Acceptability Criterion (Pass or Fail)	Pass	Pass	Pass	Pass	Pass	Pass	If P < M, Pass, else Fail

The Lot sizes are based on the installed meter count for each Lot as of 1/4/2021, when the samples lots were selected.

Summary Statistics for Weighted Average Accuracy						
Lot #	1	2	3	4	5	6
Lot Description	Centron	Centron Bridge (IP)	Centron Bridge (3P)	GE I-210(+C)	Other Solid State	Electro-Mechanical
Minimum	99.7	99.93	99.84	99.71	99.85	99.49
Maximum	100.4	100.22	100.22	100.12	100.08	100.34
Average	100.00	100.05	100.03	99.91	99.99	99.94
Standard Deviation	0.0951	0.0604	0.0653	0.0752	0.0490	0.2720
3 Sigma	0.29	0.18	0.20	0.23	0.15	0.82